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Title:
Fasteners.

Abstract:

A fastener (10) suitable for clipping together sheet material comprises two flat plastics members (11,12) of generally corresponding shape. The two members are connected along corresponding edges by a hinge (13) which tends to urge the two members apart. One member (11) carries a stud (15) which is engageable with a snap action in a hole (20) provided in the other member (12) to fasten the member together. In use, the stud (15) is pushed from one side through the sheets of paper to be held together to engage with the hole (20) on the other side, so fastening the sheets together, the paper penetrated by this stud (15) being pushed between the stud (15) and the hole (20) to lock them together. The stud (15) and the hole (20) can be disengaged to allow re-use of the fastener.

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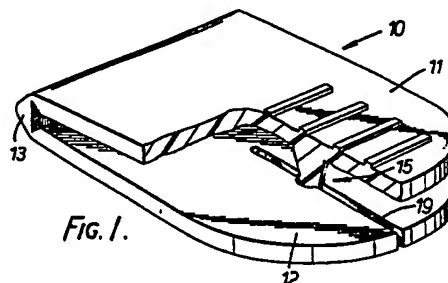
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⑥④ Fasteners.

⑥⑦ A fastener (10) suitable for clipping together sheet material comprises two flat plastics members (11,12) of generally corresponding shape. The two members are connected along corresponding edges by a hinge (13) which tends to urge the two members apart. One member (11) carries a stud (15) which is engageable with a snap action in a hole (20) provided in the other member (12) to fasten the member together. In use, the stud (15) is pushed from one side through the sheets of paper to be held together to engage with the hole (20) on the other side, so fastening the sheets together, the paper penetrated by this stud (15) being pushed between the stud (15) and the hole (20) to lock them together. The stud (15) and the hole (20) can be disengaged to allow re-use of the fastener.



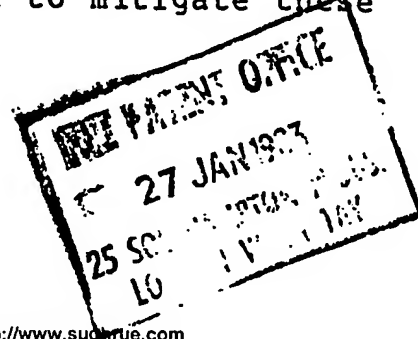
FASTENERS

The invention relates to fasteners and particularly, but not exclusively, to re-usable fasteners for fastening
5 together sheets of paper or other sheet material.

Two forms of fastener commonly used for fastening together sheets of paper are paper clips and staples. Paper clips have the disadvantage that they have only a
10 frictional fastening action and so allow the sheets to be separated from one another. In addition, they tend to catch on other sheets which are not intended to be held by the clip and so two sets of sheets can sometimes be inadvertantly clipped together. For this reason many
15 offices will not use paper clips.

Staples do not have these disadvantages; they hold the sheets together by positive gripping action. However, they have the disadvantage that they require a machine
20 to insert them, a supply of staples to replenish the machine and a further device to remove them. Their removal is not easy and can damage finger nails.

It is an object of the invention to mitigate these
25 disadvantages.



According to a first aspect of the invention, there is provided a fastener comprising two connected members, one member carrying at least one stud movable to a position in register with a corresponding hole in the
5 other member, the stud and hole being so formed that the stud is insertable through the hole with a snap action to hold the members together and that the stud can be removed from the hole by reverse snap action for re-use of the fastener.

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According to a second aspect of the invention, there is provided a fastener for connecting together a number of sheets of paper comprising a one-piece plastics moulding including two flat members of generally corresponding
15 shape connected along corresponding edges by a single hinge which tends to urge the two members apart, one member carrying a stud which has a pointed end for penetrating the paper and which is spaced from the hinge, and the other member having a hole, the hinge
20 being such that, as the fastener is closed, the stud registers with the hole, the stud being insertable through the hole after penetrating the paper, and then engaging behind the stud with a snap action, so fastening the members together, the members being
25 separable to disengage the stud from the hole for re-use.

The following is a more detailed description of some embodiments of the invention, by way of example, reference being made to the accompanying drawings, in which:-

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Figure 1 is a perspective view, partially broken away, of a first form of fastener,

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Figure 2 is a cross-section through the fastener of Figure 1,

Figure 3 is a view at "A" in Figure 2,

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Figure 4 is a view of the fastener of Figures 1 to 3 when in use to fasten together a number of sheets of paper,

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Figure 5 is a perspective view of a second form of fastener and a detail showing this fastener in use,

Figure 6 is a perspective view of a double fastener, in use,

25

Figure 7 shows a modified form of head for the fasteners of Figures 1 to 6.

Referring first to Figures 1 to 3, the first fastener 10 comprises a one-piece plastics moulding which forms two flat members 11, 12 which are generally of the same shape: rectangular with a semi-circular rounded end. A
5 single hinge 13 is formed between the members by three parallel but spaced lines 14 of reduced thickness (see Fig. 2). The natural resilience of the plastics material tends to urge the two members apart.

10 One member 11 is formed with a stud 15 which lies at the centre of the semi-circular rounded end. The stud 15 comprises a stem 16 and a round head 17 which has a pointed conical end 18 (see Fig. 2) whose cone angle is 120°. The other member 12 is formed with a slit 19
15 which extends from the end of the member along a radius and through the centre of the semi-circle defining said end. A hole 20 is formed at the centre of the semi-circle and has bevelled edges. The hinge 13 is so located that, as the fastener is closed, the hole 20
20 comes into register with the stud 15.

The fastener 10 is injection moulded in one-piece from polystyrene, polyvinylchloride, polypropylene, nylon or acetyl. The moulding is generally flat and is bent to
25 form the fastener. The plastics material can have any desired colour; indeed, fasteners of various colours

could be produced to allow colour coding of documents.

In use, the fastener 10 can be used to fasten a variety of objects together. One principle use is to fasten a number of sheets of paper together either by use of registering holes in the sheets or without the use of such holes. Where holes are provided, the sheets are arranged in register and the open fastener is arranged with the stud 15 and hole 20 in register with respective opposite ends of the holes in the sheets. The stud is then inserted through the holes in the sheets and through the hole 20. As the head 17 engages the bevelled edges of the hole 20, the slit 19 allows the hole to deform resiliently and the head 17 thus passes through the hole 20. The hole 20 then closes behind the head 17 with a snap action so fastening the two members, and the sheets of paper together. It will be appreciated that the head 17 will be of a size which allows it to pass through the holes of standard size which are formed in the paper.

Where no holes are provided in the sheets of paper to be fastened together, the fastener 10 is arranged so that the members 11, 12, embrace the sheets and the members are then pushed together so that the pointed end 18 of the head penetrates the paper before snapping into the

hole 20. Because only a single hinge 13 is provided, the head 17 always comes into register with the hole 20 as the fastener is closed.

- 5 The penetration of the paper by the pointed end 18 forms a hole in the paper by bursting through the paper so that fingers of papers are left around the hole formed thereby. This paper is pushed through the hole 20 by the head 17 and locates between the head 17 and the hole
10 20 as they snap together, as shown in Figure 4. This helps lock the head 17 and the hole 20 together. In addition, the presence of the slit 19 allows the hole 20 to expand and contract to accommodate differing amounts of paper without permanent deformation of the hole.
15 This allows the fastener to be re-used.

In both cases, the fastener can be readily disengaged by separating the two members 11, 12 causing the head 17 to deform the hole 20 and pass therethrough. This is
20 assisted by the bevel on the hole and a reverse bevel on the head. The fastener can then be subsequently re-used. The spacing of the hinge lines 14 and the length of the stem 16 are arranged such that a number of sheets of paper can be accommodated between the members 11, 12
25 while the members remain parallel to one another.

Referring next to Figure 5, the second form of fastener 30 is for fastening together sheets of paper at their corners, as shown in the detail. In the description that follows, parts common to this fastener and to the first fastener 10 will be given the same reference numerals and will not be described in detail.

In the second fastener 30, the two members 11, 12 have only one corner rounded. The stud 15 and hole 20 are arranged as described above with reference to Figures 1 to 3. The member 12 carrying the hole 20 is formed along the longer edge thereof, which does not end in the rounded end, with a wall 31 which is of such a height that when the members 11, 12 are parallel to one another the edge of the wall is level with the outer surface of the other member 11. Thus the hinge 13 and the wall 31 are at right angles to one another and form a corner into which can be inserted the corner of a stack of sheets to be fastened together, as shown in the detail.

The manufacture and remaining use of the fastener of Figure 5 is as detailed above with reference to Figures 1 to 4.

It will be appreciated that more than one stud and hole may be provided, for example, two studs and holes may be

provided at a spacing which corresponds to the hole spacing provided in paper for insertion into loose-leaf binders or provided in computer print-out paper. In this case, the members 11, 12 will be wider, as shown in
5 Figure 6. Wording may be printed or moulded on the outer surface of one of the members, as also shown in Figure 6.

The stud need not be provided spaced from the end of one
10 member, it could be provided projecting from the end of one member. The head of the stud can have any convenient shape; for example, it could be generally spherical.

15 The slit 19 may be of any length to give the hole 20 a required resilience. It may terminate at the hole 20 or it may extend beyond the hole 20, as shown in Figure 1.

It will also be appreciated that the angle of the
20 conical ends 18 need not be 120° ; they may be any suitable angle such as 90° to aid penetration of material by the head. In addition, the head 17 may be one of a succession of such heads provided consecutively on the end of the stem 16 to provide a number of
25 alternative engagement positions between the two members (see Figure 7).

In addition, one or both of the members may be provided with a bevel at the end thereof remote from the hinge to allow a finger to be pushed beneath the member to facilitate the opening of the fastener.

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The fastener may carry, or be adapted to carry, a tag or plate on which matter may be written or printed.

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CLAIMS

1. A fastener characterised in that the fastener comprises two connected members (11,12), one member (11) carrying at least one stud (15) movable to a position in register with a corresponding hole (20) in the other member (12), the stud and hole being so formed that the stud and hole being so formed that the stud is insertable through the hole with a snap action to hold the members together and that the stud can be removed by reverse snap action for re-use of the fastener.

2. A fastener according to claim 1, characterised in that the or each stud (15) comprises a stem (16) extending from said one member and a head (17) at the end of said stem, the corresponding hole (20) being resiliently deformable to allow said head to pass therethrough before engaging behind said head to fasten the members together.

20

3. A fastener according to claim 2, characterised in that the head (17) has a pointed, preferably conical, end to allow the head to penetrate a sheet or sheets of paper before passing through the hole, to fasten the sheets of paper together.

4. A fastener according to claim 2 or claim 3, characterised in that the hole (20) is formed in a slit (19) which extends from an edge of said member (12), the slit allowing the hole to deform resiliently as the head
5 passes therethrough and then reclosing the hole behind the head.

5. A fastener according to any one of claims 1 to 4, characterised in that the members are connected by a
10 single hinge (13) so located that, on pivoting between the members, the stud is reliably aligned with the hole.

6. A fastener according to any one of claims 1 to 5, characterised in that the stud (15) and hole (20) are so
15 arranged that, when the stud penetrates a sheet or sheets of material, the penetrated material is urged through the hole to locate between the hole and the stud to hold the fastener closed.

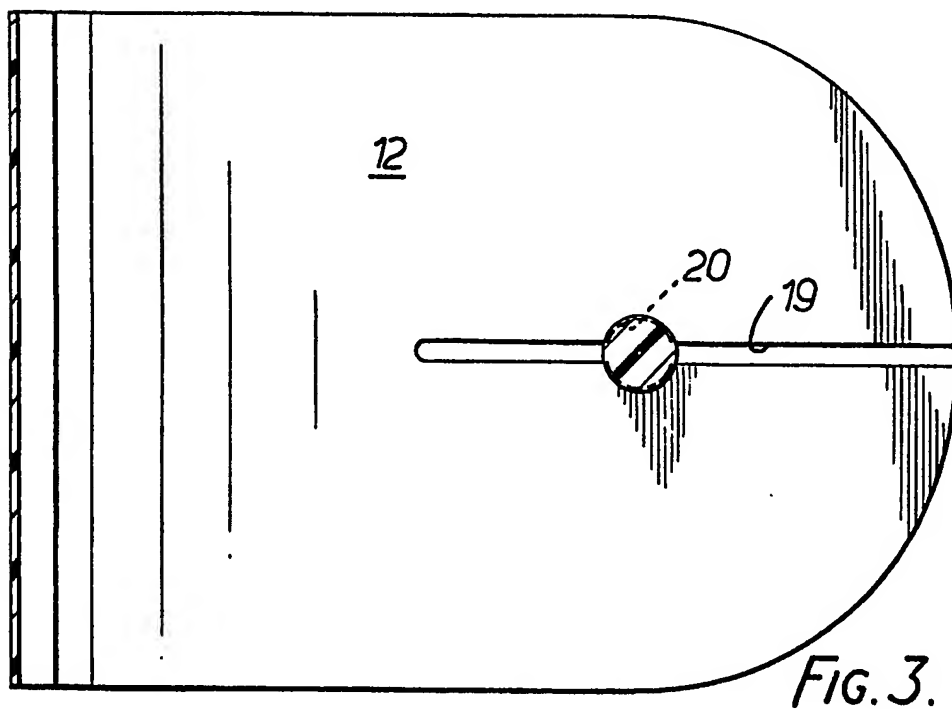
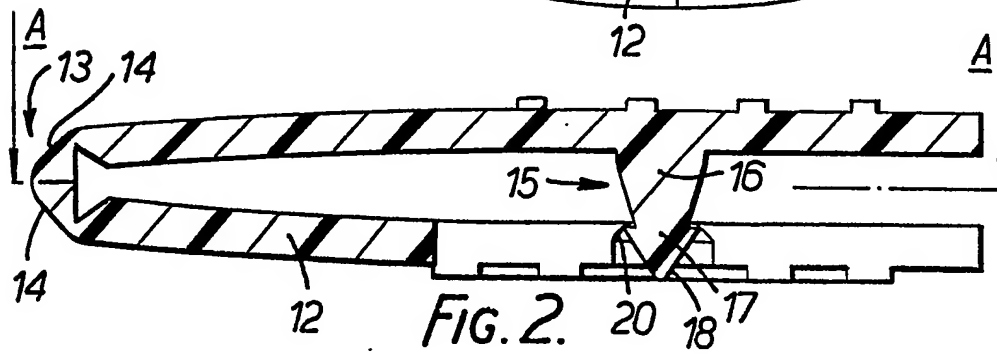
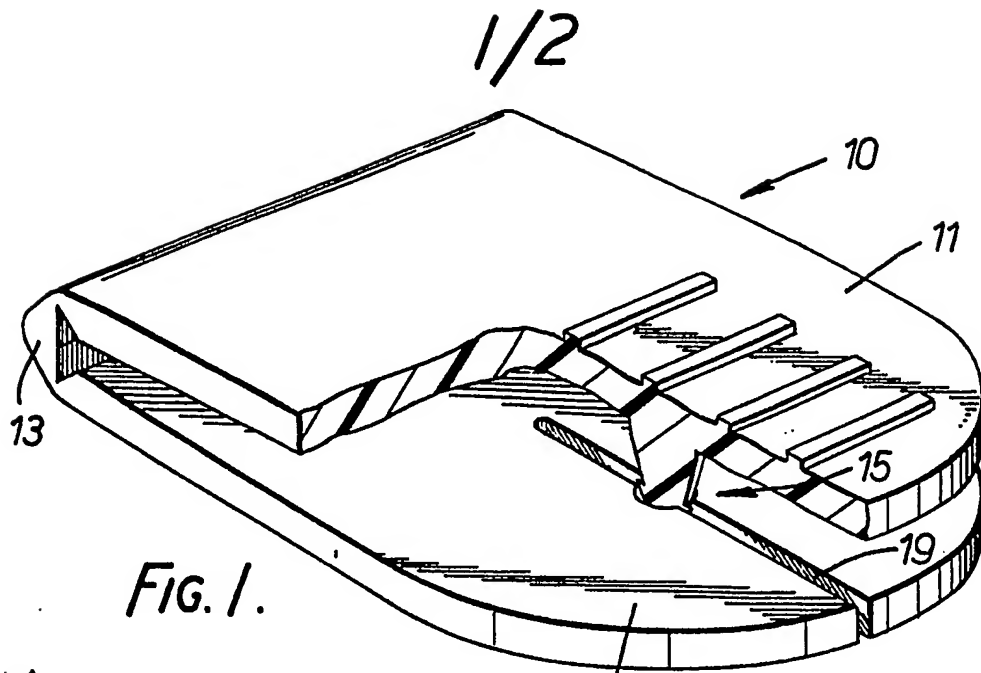
20 7. A fastener according to any one of claims 1 to 6, and made of a plastics material in one piece.

8. A fastener for connecting together a number of sheets of paper characterised by comprising a one-piece
25 plastics moulding (10) including two flat members (11,12) of generally corresponding shape connected along

corresponding edges by a single hinge (13) which tends to urge the two members apart, one member (11) carrying a stud (15) which has a pointed end (16) for penetrating the paper and which is spaced from the hinge, and the
5 other member (12) having a hole (20), the hinge being such that, as the fastener is closed, the stud registers with the hole, the stud being insertable through the hole after penetrating the paper, and then engaging behind the stud with a snap action, so fastening the
10 members together, the members being separable to disengage the stud from the hole for re-use.

9. A fastener according to any one of claims 1 to 8, characterised in that there are provided two or more
15 studs each associated with a respective hole.

10. A fastener according to claim 2 or claim 9, characterised in that the or each stud is formed with two or more heads (17, Fig.7), each of which is
20 engageable with the hole, to provide a variable spacing between the members.



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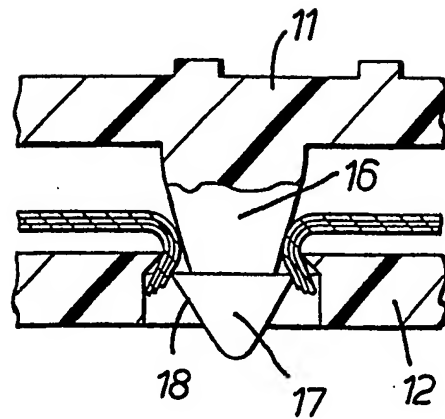


FIG. 4..

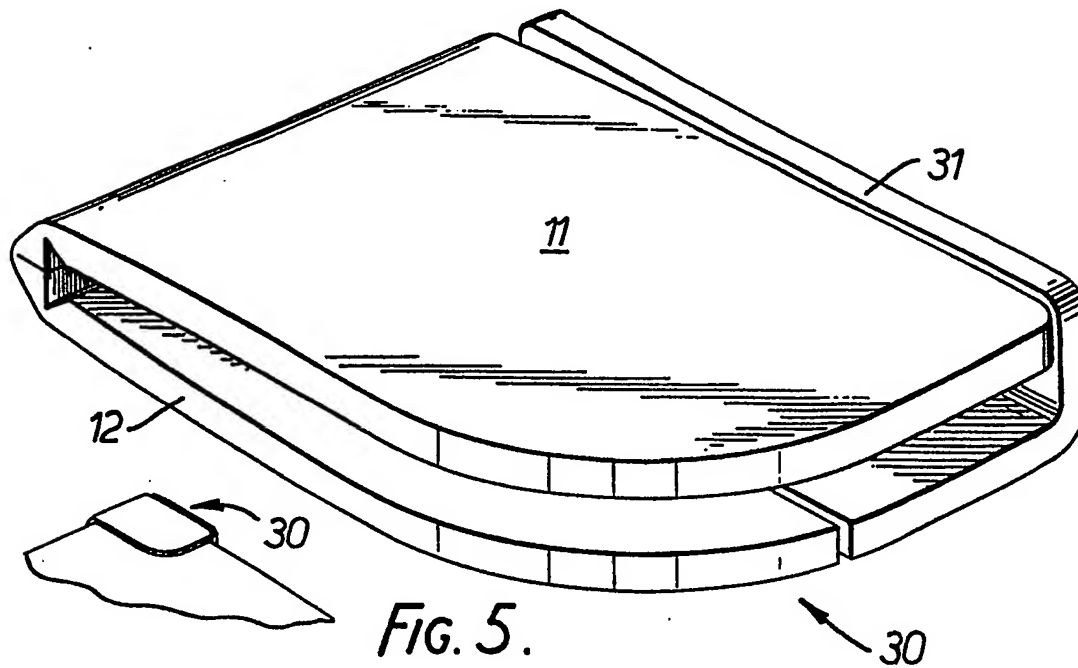


FIG. 5.

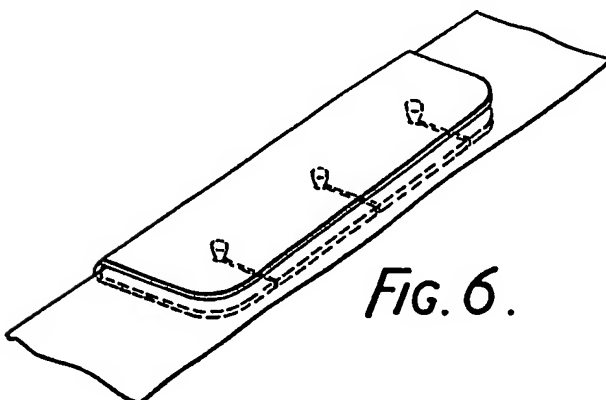


FIG. 6.

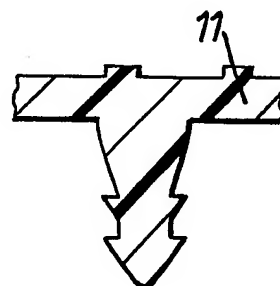


FIG. 7.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	DE-C- 616 118 (SEUSTER) * Page 2, lines 10-21; figures 1-3 *	1,3,5 6,8	B 42 F 3/00
X	US-A-3 729 780 (WHITE) * The whole document *	1,3,5 7,8	
X	US-A-3 699 617 (HOFMEISTER) * Column 3, line 37 - column 4, line 54; figures 1-9 *	1,2,3 4,5,7 8,9,10	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			B 42 F A 44 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-04-1983	Examiner LONCKE J.W.
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